TOWN OF AMHERST

Public Works Department

MEMO

DATE: 1/8/2015

TO: JOHN P. MUSANTE

CC: GUILFORD MOORING

FROM: JASON O. SKEELS

RE: TRAFFIC CALMING REQUEST AT HENRY STREET AND PINE STREET

Mr. Musante:

The Public Works Committee recently received requests for traffic calming on the northerly end of Henry St between the intersections of Pine St and Market Hill Rd. The three traffic calming treatments requested were:

1. Installing multi-way stop sign at Henry St and Pine St.
2. Installing speed humps
3. Closing the roadway at the intersection of Market Hill Rd.

We have explored each of these options and have provided the following recommendations:

1. Multi-Way Stop:
   We have examined the request to install a Multi-Way Stop at this location using the warrant analysis guidance in the ***Manual on Uniform Traffic Control Devices for Streets and Highways 2009 Edition (MUTCD2009)***. We have attached section 2B.07 of the MUTCD 2009 to this letter for your review. Based on the data collected and submitted for the Traffic Impact Study prepared by Beta Group, Inc for the proposed Retreat Amherst in May 2014 (relevant excerpts attached) none of the warrants contained in the MUTCD were met at this location so we would advise against a multi-way stop. The Amherst Police Department reported no accidents at this location for the last three years.

   Multi-way stop control request are often submitted as an attempt to achieve traffic calming. Stop signs should never be used as traffic calming devices as they are regulatory traffic controls with strict state and federal guidelines on when and where they should be implemented. Countless research studies have been conducted showing that unwarranted stop signs can often result in increased speeding and collisions as well as decreased pedestrian safety. Unwarranted multi-way stops also present potential liability problems for undocumented exceptions to accepted warrants.

2. Speed Humps:
   Henry Street is classified as an urban minor arterial. The Mass DOT Project Development and Design Guide only recommend speed humps on local and minor collector roadways.

Installing speed humps on an arterial roadway is inappropriate and contrary to the function of the roadway.

3. Roadway Closure:
   Roadway closures are only appropriate if viable safe and effective alternate routes can be provided. If Henry Street was closed at Market Hill Road this would force all traffic down Pine Street to Bridge Street through another high pedestrian volume area including the Cushman Market and the Cushman Common. If a traffic calming solution creates a problem in another area it is not a viable solution.

Very Truly Yours,

Jason O. Skeels, PE
Town Engineer

Section 2B.07 Multi-Way Stop Applications

Support:

01 Multi-way stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multi-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Multi-way stop control is used where the volume of traffic on the intersecting roads is approximately equal.

02 The restrictions on the use of STOP signs described in Section 2B.04 also apply to multi-way stop applications.

Guidance:

03 The decision to install multi-way stop control should be based on an engineering study.

04 The following criteria should be considered in the engineering study for a multi-way STOP sign installation:

A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.

C. Minimum volumes:

1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and

2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but

3. If the 85th -percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.

D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

Option:

05 Other criteria that may be considered in an engineering study include:

A. The need to control left-turn conflicts;

B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;

C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and

D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

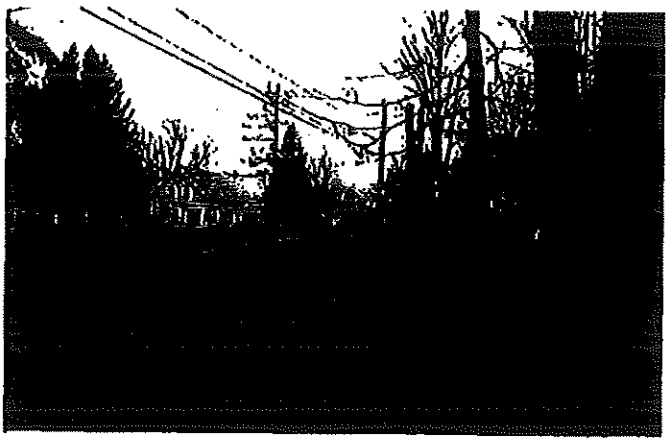
Key Study Area Intersections

The previous section identified the major routes that will be servicing the *Retreat Amherst* residential subdivision. Along these routes we have identified key intersections that require analysis of potential impacts, the following intersections were reviewed as part of this study;

- Henry Street at Pine Street
- Bridge Street at Market Hill Road
- Bridge Street at Pine Street
- East Pleasant Street at Pine Street
- East Pleasant Street at Eastman Lane/Tilson Farm Road
- East Pleasant Street at Strong Street
- Henry Street at Flat Hills Road/Shutesbury Road
- North Pleasant Street at Pine Street/Meadow Street

Henry Street and Pine Street Intersection

Henry Street and Pine Street intersect to form an unsignalized, "T" type intersection with stop control on Pine Street. Henry Street and Pine Street are both two-way roadways running north-south and east-west, respectively. The pavement markings are faded and in need of replacement, specifically the stop line on the Pine Street approach. The stop sign is also old, faded and damaged and should be replaced. Bituminous berm is provided at the intersection, with sidewalk on the northwest corner. The adjacent photograph depicts the intersection looking north to Pine Street.

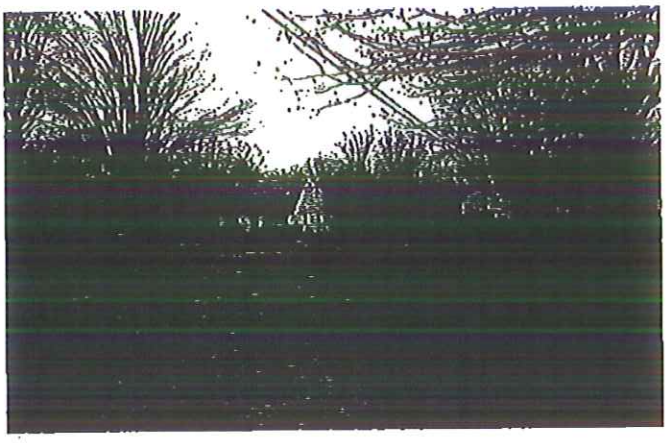


The speed limit is posted at 25 mph on both the Henry Street northbound and southbound approach to Pine Street. There was no observed posted speed limit on Pine Street approach to

Henry Street though due to the nature of the roadway and posted speed to the west, was assumed to be 25 mph. A review of the sight lines for the stop controlled approach determined that sight distances in excess of 300 feet are available to the north and south of the junction. These values are greater than the 155-foot minimum stopping sight distance criteria required according to AASHTO standards for the posted speed limit of 25 mph, observed travel speeds between 25 and 35 mph, and are sufficient for speeds in excess of 40 mph. Due to the high density developed nature of properties surrounding the intersection, it is recommended that an advanced intersection warning sign be placed on the northbound approach alerting motorist of the junction.

Bridge Street and Market Hill Road Intersection

Bridge Street and Market Hill Road intersect to form an unsignalized, "T" type intersection with stop control on Market Hill Road. Bridge Street and Market Hill Road are both two-way roadways running north-south and east-west, respectively. The pavement condition at the intersection can be classified as poor with moderate alligator cracking, potholes, and edge distress. The pavement markings are faded and in need of replacement, or are not provided. Specifically the stop line on the Market Street approach should be replaced along with a double yellow centerline delineation from the stop line to the new access to the subdivision off of the Water Treatment Facility roadway. The stop sign is also old and damaged and should be replaced. Bituminous berm is provided at the intersection, with no sidewalk. The above photograph shows these characteristics of the roadway looking west on Market Hill Road.



The speed limit is posted at 25 mph on both the Bridge Street northbound and southbound approach to Market Hill Road. There was no observed posted speed limit on Market Hill Road

Summary Accident Data

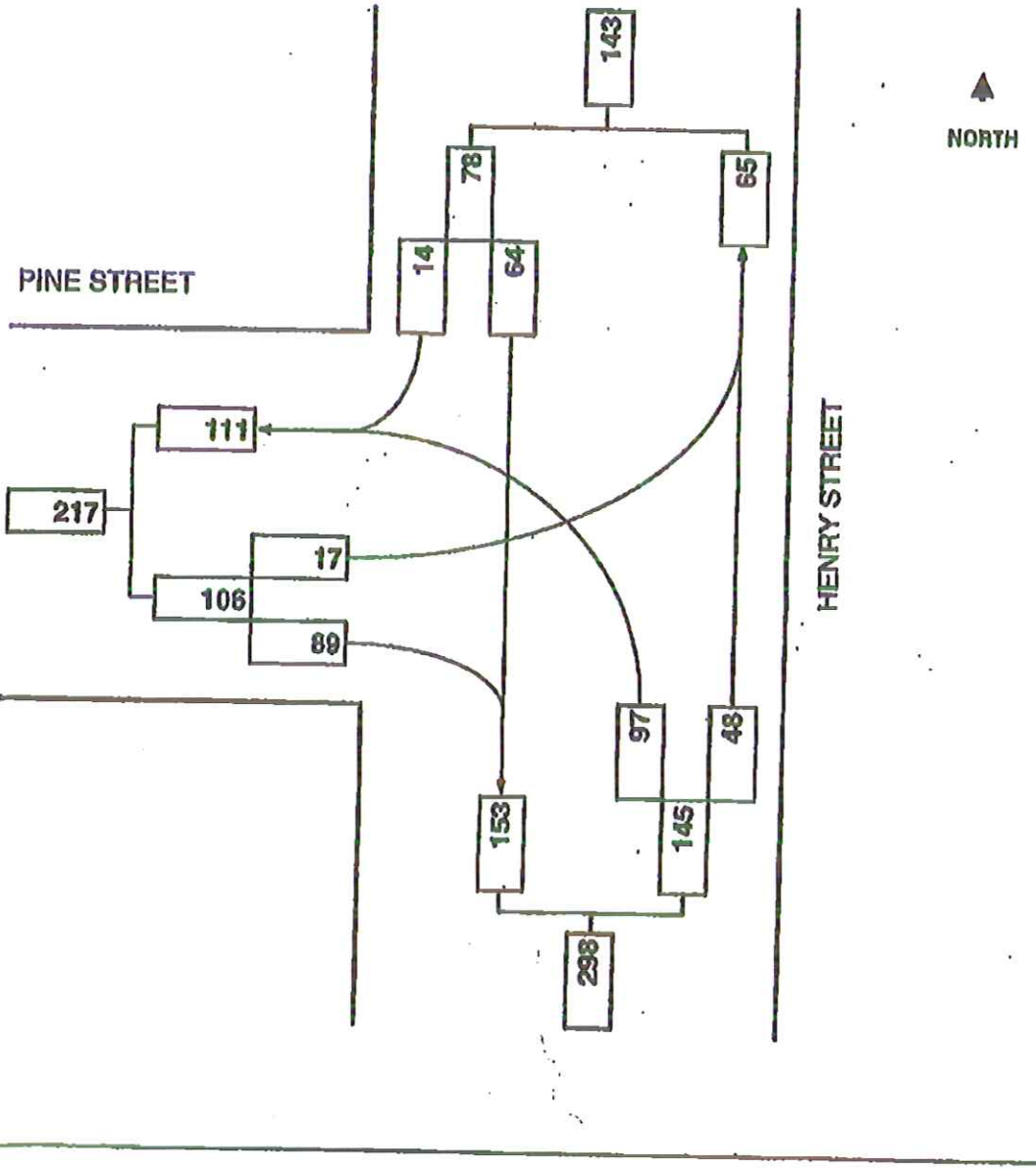
Intersection	Year			Total	Average per Year
	2011	2012	2013		
Henry St. at Pine St.	0	0	0	0	0
Bridge St. at Market Hill Rd.	1	0	0	1	1
Bridge St. at Pine St.	2	0	1	3	1
E. Pleasant St. at Pine St.	7	3	4	14	5
E. Pleasant St. at Eastman Ln.	9	2	1	12	4
E. Pleasant St. at Strong St.	4	1	7	12	4
N. Pleasant St. at Pine St.	5	8	7	20	7
	28	14	20	62	

BETA Group, Inc.

Turning Movement Diagram

Major Street: Henry Street
City/Town: Amherst, MA
Reference No.: 4512
Existing: AM Peak

Minor Street: Pine Street
Day of Week: Weekday
Peak Period: 8:00 AM - 9:00 AM
Future: n/a



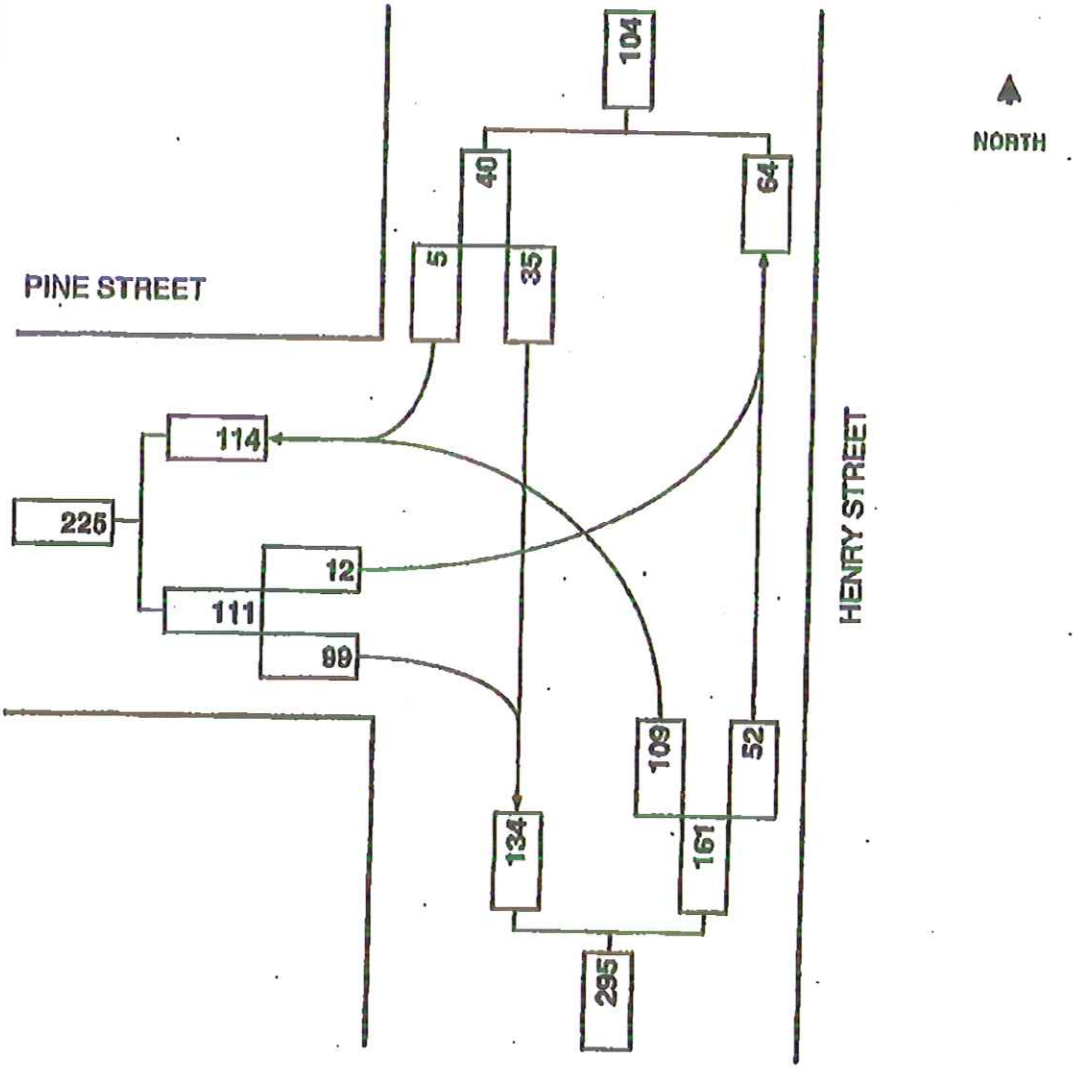
Henry Street at Pine Street

BETA Group, Inc.

Turning Movement Diagram

Major Street: Henry Street
City/Town: Amherst, MA
Reference No.: 4512
Existing: PM Peak

Minor Street: Pine Street
Day of Week: Weekday
Peak Period: 5:00 PM - 6:00 PM
Future: n/a



TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	HCP	Intersection	Henry St. & Pine St.
Agency/Co.	BETA Group, Inc.	Jurisdiction	Amherst, MA
Date Performed	3/28/2014	Analysis Year	2014
Analysis Time Period	AM Peak - Existing		

Project Description 4512 - The Retreat

East/West Street: Pine Street | North/South Street: Henry Street

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	97	46			64	14
Peak-Hour Factor, PHF	0.88	0.88	1.00	1.00	0.88	0.88
Hourly Flow Rate, HFR (veh/h)	19	0	101	0	0	0
Percent Heavy Vehicles	2	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	17		89			
Peak-Hour Factor, PHF	0.88	1.00	0.88	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	72	16	110	64	0
Percent Heavy Vehicles	2	0	2	0	0	1
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	110						120	
C (m) (veh/h)	1509						890	
v/c	0.07						0.13	
95% queue length	0.24						0.47	
Control Delay (s/veh)	7.6						9.7	
LOS	A						A	
Approach Delay (s/veh)	--	--					9.7	
Approach LOS	--	--					A	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	VHP	Intersection	Henry St. & Pine St.
Agency/Co.	BETA Group, Inc.	Jurisdiction	Amherst, MA
Date Performed	3/28/2014	Analysis Year	2014
Analysis Time Period	PM Peak - Existing		

Project Description 4612 - The Retreat

East/West Street: Pine Street | North/South Street: Henry Street

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	109	52			35	6
Peak-Hour Factor, PHF	0.87	0.87	1.00	1.00	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	13	0	113	0	0	0
Percent Heavy Vehicles	2	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12		99			
Peak-Hour Factor, PHF	0.87	1.00	0.87	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	40	6	125	69	0
Percent Heavy Vehicles	2	0	2	0	0	1
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	125						126	
C (m) (veh/h)	1563						957	
v/c	0.08						0.13	
95% queue length	0.26						0.45	
Control Delay (s/veh)	7.5						9.3	
LOS	A						A	
Approach Delay (s/veh)	--	--					9.3	
Approach LOS	--	--					A	

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